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ABSTRACT

Content-specific vocabulary instruction was used in four seventh and eighth grade social studies and science classes as a method for improving the English language ability of non-native English speakers. A total of 52 monolingual English-speaking non-Hispanic students, 7 monolingual English-speaking Hispanic students, 6 Spanish-listening Hispanic students, and 7 Spanish-speaking Hispanic students participated in the project. The instruction consisted of brief English/Spanish vocabulary drills at the beginning and at the end of each class session. The students were administered the Spanish Written Vocabulary Test, Forms A and B, and the English Multiple-Choice Content Test, Forms A and B. The findings showed that, of the four groups, English/Spanish vocabulary instruction in content-area classes was most effective in increasing the English/Spanish vocabulary of those students who had some functional use of English. The Spanish-speaking Hispanic group also scored most poorly on the English-content tests. (FL)

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TEACHING ENGLISH VOCABULARY IN SECONDARY CONTENT-AREA CLASSES

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There are over five million school age children who have very limited English-speaking ability. Their numbers are increasing yearly. If these children are going to receive an adequate education which develops their potential for learning, then more secondary teachers must address themselves to the English language needs of these students. Presently there are ESOL (English to Speakers of Other Languages) programs and bilingual education programs to meet their needs, but the numbers and scopes of these programs are not sufficient to radically decrease the high drop-out rate of limited English-speaking-ability students. For example, in 1975 it was reported that the average Navajo had only 3.9 years of formal education. In addition, twenty-five percent of Mexican-American adults have completed less than five years of schooling (Pena, 1975). These limited English-speaking students have three important challenges in the schools: learning English as quickly as possible, improving their English skills so that they can understand the content presented in the content area classrooms, and having a high self-concept regarding their ability to learn and contribute in an English-speaking society.

The secondary content-area class could provide a means for extending the English language instruction of the student with limited English. Reading specialists have demonstrated that secondary content-area classes can be very effective in teaching reading; not only are students' reading skills increased but also more content can be learned (Thelen, 1976). Similarly,

English language skills could be taught by the content-area teachers to the students with limited English if these teachers were instructed in methods which could be easily used in their classes.

English Instruction in Content-Area Courses

Literature and observations indicate that English language skills can be effectively increased in content-area courses. During a videotaped summer session of limited English-speaking students in an experimental program at the Pennsylvania State University, the students' motivation for language learning was greatly increased during the content-oriented sessions. When the teaching shifted to the units of English language instruction, the students' motivation sharply dropped and the students became bored. Skalkin's Russian study (1973) emphasized that there were eight spheres of verbal communication and the teaching of language will be more effective when it is based on the communication needs of the students. Of course, one of the greatest English language needs of limited English-speaking students is the understanding of the materials presented in content-area courses. Furthermore, Belasco (1970) showed that the use of good contextual materials was more effective in teaching language skills than the use of rigid traditionally sequenced language instructional materials. There studies, therefore, indicate that secondary teachers could consider ways of increasing English language instruction in secondary content-area classes.

Vocabulary and Content Learning

Studies have also suggested that increasing vocabulary instruction could increase content learning. Vygotsky (1962) emphasized the role of language and language labelling, assigning a name to a referent, in thought processes. Spache (1976) affirmed that vocabulary development has

been recognized as being closely predictive of intelligence ability and school success or content learning since the beginnings of intelligence testing. Bransford and Johnson (1972) showed the importance of retrieval cues and clear semantic context in recalling previously learned information. In addition, the study of the role of words in the entry and recall of information from the brain, has been stimulated by studies in the cognitive processing which are investigating the parallel functions of modern computers and the human brain (Lindasy and Norman, 1977; Collins and Quillian, 1972).

With respect to vocabulary research, Petty, Herold, and Stoll (1968) did a large review of the literature related to vocabulary instruction in which they used 565 titles and 80 studies. The results of their study indicated that very little of substance is known about the teaching of vocabulary and their recommendation is that more research conerning vocabulary be made so that vocabulary can be taught adquately.

Vocabulary Instruction of This Study

In order to increase the English language ability of nonnative English speakers, a method was proposed for this study for increasing content-specific vocabulary daily in secondary science and social studies classes. The vocabulary instruction consisted of brief daily English-Spanish vocabulary drills given at the beginning and end of every class session in secondary social studies and science classes. The six key words chosen for the drill were the key words of the instructional session.

The procedure for the English-Spanish vocabulary instruction was as follows:

Step 1. At the beginning of each instructional session, the six key content-specific vocabulary words were displayed in front of the class on

clearly visible charts. The English words were written in red and the Spanish words were written beside them in black.

Step 2. The English and Spanish equivalents were modeled in a loud voice and the students together repeated the two words loudly and clearly. The teacher and the students followed this procedure twice for each of the six key words. The procedure required less than two minutes of class time. The chart with the key words was kept visible to all students throughout the entire instructional session.

Step 3. At the end of the instructional session, the teacher and the students repeated the same rapid process of vocabulary instruction which was used at the beginning of the session.

The six key content-specific words which were taught with each instructional session were chosen by the experimenter. They were chosen on the basis of their importance for concept learning and their importance for general English-Spanish reading and writing proficiency. With few exceptions content rather than function words were chosen. For example, in the history session about discoveries in the New World, the English-Spanish vocabulary consisted of the following words: gold-oro, short-corta, fountain-fuente, treasure-tesoro, territory-territorio, around-alrededor.

Setting

Three seventh grade classes and one eighth grade class participated in the experiment. Two of the classes were social studies classes in [redacted] an inner-city, small parochial school in a nonpoverty section of downtown [redacted] Subjects from this school included 32 monolingual English-speaking Nonhispanic students and 7 monolingual English-speaking Hispanic students. The other two classes were science classes in [redacted] Junior High School [redacted] which consisted of students

from the three rural farm towns of the [redacted] division. The students from [redacted] Junior High School included 20 monolingual English-speaking Nonhispanic students, 6 Spanish-listening Hispanic students (students who understood spoken Spanish but responded in English at least 75% of the time in school as determined by daily teacher observations) and 3 Spanish-speaking Hispanic students (Hispanic students who understood spoken Spanish and responded in Spanish at least 75% of the time in school as determined by daily teacher observations.)

One of the purposes of the study was to examine how the vocabulary of two languages used by students in a secondary class could be related to content matter taught in a regular English-speaking class. Therefore, the planning relationship between the experimenter and the classroom teachers paralleled the planning relationship usually existing between resource specialists and the secondary classroom teachers (Devan, 1977). The three classroom teachers involved in the study chose the objectives, the content materials, and methods which they found most suitable for the students in their classes. The experimenter studied the science and social studies unit chosen by the teachers and prepared the English-Spanish vocabulary instruction and the multiple-choice tests to accompany each instructional session.

All three teachers attempted to continue with their same teaching methods throughout the investigation. They also attempted to use content material of similar difficulty throughout the investigation. This procedure was followed in order to minimize the variability of instructional sessions.

Questions of the Study

The major questions which were examined were the following:

Question 1. Can English-Spanish vocabulary be effectively taught in secondary social studies or science classes which contain Hispanic and Nonhispanic students?

Question 2. Will that English-Spanish vocabulary instruction have positive effects on the amount of content learned in the social studies and science classes?

Question 3. Will the four language-ethnic groups (monolingual English-speaking Nonhispanic students, monolingual English-speaking Hispanic students, Spanish-listening Hispanic students, and Spanish-speaking Hispanic students) differ in the language learning and content learning?

To answer these questions, the two dependent variables of English-Spanish vocabulary learning and content learning, were measured by the following two test instruments:

(a) Spanish Written Vocabulary Test, Form A and Form B

(b) English Multiple-Choice Content Test, Form A and Form B.

In the vocabulary test the students were given orally six key vocabulary words in English and were required to write the Spanish equivalent words. The reliability of Form A was 0.93 and the reliability of Form B was 0.97. The English Multiple-Choice Content Test consisted of the students' choosing the English answers to English content questions which summarized the content of the instructional session. The reliability of Form A was 0.89 and the reliability of Form B was 0.83. The reliabilities of the tests were determined by using the Kuder-Richardson formula 20.

Experimental Design

The experiment was a 4 x 2 repeated measures design as shown in Figure 1. The independent variable, the treatment whose effects were being studied in the investigation, was the English-Spanish vocabulary instruction. The

	Instruction with English-Spanish Voc. Instruction	Instruction without English-Spanish Voc. Instruction
Monolingual English-speaking Nonhispanics (NH)	Ms	Ms
Monolingual English-speaking Hispanics (EH)	Ms	Ms
Spanish-listening Hispanics (LH)	Ms	Ms
Spanish-speaking Hispanics (SH)	Ms	Ms

Ms are mean scores for the following dependent variables:
Spanish Written Vocabulary Tests (for English spoken words)
English Multiple-Choice Content Tests

Figure 1. Repeated Measures Experimental Design

two conditions which were compared were the language and content learned when there were brief English-Spanish vocabulary drills given and the language and content learned when there were no English-Spanish vocabulary drills.

Analysis

The data from the test instruments were analyzed by the statistical programs ANOVR (An Analysis of Variance with Repeated Measures), FOLUP (A Program for Pairwise Contrasts After an Analysis of Variance), and STPAC(A One-Way analysis of Variance) which are maintained at the [redacted]

[redacted] Computation Center and by hand-calculated t-tests.

In analyzing the data for the English-Spanish vocabulary acquisition, the analysis of variance of repeated measures indicated a lack of homogeneous variance covariance matrixes. Therefore the dependent t-statistic was used to determine the effects of the English-Spanish vocabulary instruction (Glass and Stanley, 1970). In analyzing the differences in language-ethnic groups in relationship to the English-Spanish vocabulary acquisition, the analysis of variance of repeated measures indicated a lack of homogeneity of the variance covariance magrixes. Therefore in order to determine significant differences, a modified Tukey WSD was used (Games and Howell, 1975). Because there were many other analyses being made on the same set of data for other studies, these two questions pertaining to English-Spanish vocabulary acquisition were tested at the .01 alpha error level of significance. The remaining questions were designed to be tested at the .05 alpha error level of significance.

Findings

The mean scores of the English-Spanish Vocbulary Test showed that three of the four student groups learned significantly more English-Spanish Vocabulary when there was English-Spanish vocabulary instruction. Therefore the study showed that it was feasible to teaching English-Spanish vocabulary in a history or social studies class with varied language-ethnic groups. In comparing the mean scores of the four language-ethnic groups, the monolingual English Hispanics had significantly higher scores than the Spanish-listening Hispanics when there was English-Spanish vocabulary instruction. When there was no English-Spanish vocabulary instruction, the Spanish-speaking Hispanics scored significantly higher than the other three language-ethnic groups in the classes. See Tables 1 and 2.

Table 1. Means of Groups and *t*-Statistics: Spanish Written Vocabulary Test Scores

Groups	With Spanish-English Voc. Instruction	Without Spanish-English Voc. Instruction	Mean Differences (With and Without Voc. Instruction)	*t*-statistic
Nonhispanics (NH)	$\bar{X}$: 103.12 SD: 34.84 n: 52	$\bar{X}$: 32.65 SD: 2.85 n: 52	70.47	15.15***
Monolingual English-speaking Hispanics (EH)	$\bar{X}$: 122.14 SD: 31.10 n: 7	$\bar{X}$: 41.57 SD: 13.55 n: 7	80.57	7.23***
Spanish-listening Hispanics (LH)	$\bar{X}$: 83.83 SD: 27.21 n: 6	$\bar{X}$: 36.67 SD: 11.27 n: 6	47.16	4.21**
Spanish-speaking Hispanics (SH)	$\bar{X}$: 123.71 SD: 43.22 n: 7	$\bar{X}$: 93.43 SD: 49.57 n: 7	30.28	1.81
Combined Groups (NH+EH+LH+SH)	$\bar{X}$: 105.36 SD: 34.86 n: 72	$\bar{X}$: 39.76 SD: 15.76 n: 72	65.60	16.43***

Note. Maximum score = 180

***$p < .001$

**$p < .01$

Table 2. A Comparison of Spanish Written Vocabulary Test Mean Scores for Four Student Language-Ethnic Groups

Paired Groups	Diff.	df	t-statistic
With Spanish-English Vocabulary Instruction			
Monolingual English Hispanics (EH) Spanish-listening Hispanics (LH)	38.31	11	2.37*
Spanish-speaking Hispanics (SH) Spanish-listening Hispanics (LH)	39.88	10	2.02
Nonhispanics (NH) Spanish-listening Hispanics (LH)	19.29	7	1.59
MOnolingual English Hispanics (EH) Nonhispanics (NH)	19.02	8	1.50
Spanish-speaking Hispanics (SH) Nonhispanics (NH)	20.59	7	1.21
Spanish-speaking Hispanics (SH) Monolingual English Hispanics (EH)	1.57	11	0.08
Without Spanish-English Vocabulary Instruction			
Spanish-speaking Hispanics (SH) Nonhispanics (NH)	60.78	6	3.24*
Spanish-speaking Hispanics (SH) Spanish-listening Hispanics (LH)	50.76	7	2.94*
Spanish-speaking Hispanics (SH) Monolingual English Hispanics (EH)	51.86	7	2.67*
Monolingual English Hispanics (EH) Nonhispanics (NH)	8.92	6	1.74
Spanish-listening Hispanics (LH) Nonhispanics (NH)	4.02	5	0.87
Monolingual English Hispanics (EH) Spanish-listening Hispanics (LH)	4.90	11	0.71

*$p < .05$

It can be concluded that the brief, concentrated method of learning the English-Spanish vocabulary was effective for three of the four language-ethnic groups. The only group which did not have significant increases in correctly writing Spanish words was the Spanish-speaking Hispanic students. (Hispanic students who understood spoken Spanish and responded in Spanish at least 75% of the time in school). Therefore the English-Spanish vocabulary instruction in content-area classes was more effective in increasing English-Spanish vocabulary with students who had some functional use of English. This may suggest that the linguistic needs of those students with very limited English-speaking ability would be more effectively met by providing some daily regular bilingual classes in addition to English-Spanish vocabulary instruction in content-area classes.

With regard to the effect of vocabulary instruction on content learning, the analysis of data indicated that the mean scores of the multiple choice content test were significantly higher when English-Spanish vocabulary instruction was given, as summarized in Tables 3, 4, and 5. Additional t-tests indicated that it was the monolingual English-speaking Nonhispanic students who scored significantly higher when there was English-Spanish vocabulary instruction. In comparing the mean scores of the four language-ethnic groups, there were significant differences between the group means. The analysis showed that the monolingual English-speaking Hispanic students scored significantly higher than the Spanish-speaking Hispanic students when there was English-Spanish vocabulary instruction and when there was no vocabulary instruction.

Discussion

There are studies which indicate that content learning is increased when the same population receives instruction in two languages (Cohen, 1978;

Table 3. Repeated Measures Analysis of Variance of English Multiple-Choice Content Test Scores

Source	df	Mean Squares	F-ratio
Between Subjects			
Groups (NH,EH,LH,SH)	3	1081.929	9.34***
Error	68	115.851	
Within Subjects			
Treatments (With Spanish-English Voc. Instruction Without Spanish-English Voc. Instruction)	1	142.007	6.02*
Error	68	23.584	
Group Treatment Interaction	3	39.928	1.69

***$p < .001$

*$p < .05$

Table 4. Means of Groups and t-Statistics: English Multiple-Choice Content Test Scores

Groups	With Spanish-English Voc. Instruction	Without Spanish-English Voc. Instruction	Mean Differences (With and Without Voc. Instruction)	t-statistic
Monolingual English-speaking Nonhispanics (NH)	$\bar{X}$: 28.65 SD: 8.72 n: 52	$\bar{X}$: 26.48 SD: 8.53 n: 52	2.17	2.28*
Monolingual English-speaking Hispanics (EH)	$\bar{X}$: 38.00 SD: 5.32 n: 6	$\bar{X}$: 32.26 SD: 7.87 n: 6	5.71	2.20*
Spanish-listening Hispanics (LH)	$\bar{X}$: 25.50 SD: 4.76 n: 6	$\bar{X}$: 24.33 SD: 7.89 n: 6	1.17	0.42
Spanish-speaking Hispanics (SH)	$\bar{X}$: 13.14 SD: 8.11 n: 7	$\bar{X}$: 15.57 SD: 9.41 n: 7	-2.43	1.06
Combined Groups (NH+EH+LH+SH)	$\bar{X}$: 27.79 SD: 8.19 n: 72	$\bar{X}$: 25.81 SD: 8.51 n: 72	1.98	2.45*

Note. Maximum score = 50

*$p < .05$

Table 5. A Comparison of English Multiple-Choice Content Test Mean Scores for Four Student Language-Ethnic Groups

Paired Groups	Diff.	df	t-statistic
With Spanish-English Vocabulary Instruction			
Monolingual English Hispanics (EH) Spanish-speaking Hispanics (SH)	24.86	68	4.32***
Nonhispanics (NH) Spanish-speaking Hispanics (SH)	15.51	68	3.58***
Monolingual English Hispanics (EH) Nonhispanics (NH)	9.35	68	2.16*
Monolingual English Hispanics (EH) Spanish-listening Hispanics (LH)	12.50	68	2.09*
Spanish-listening Hispanics (LH) Spanish-speaking Hispanics (SH)	12.36	68	2.06*
Nonhispanics (NH) Spanish-speaking Hispanics (SH)	3.15	68	0.68
Without Spanish-English Vocabulary Instruction			
Monolingual English Hispanics (EH) Spanish-speaking Hispanics (SH)	16.72	68	2.91**
Nonhispanics (NH) Spanish-speaking Hispanics (SH)	10.91	68	2.52*
Spanish-listening Hispanics (LH) Spanish-speaking Hispanics (SH)	8.76	68	1.47
Monolingual English Hispanics (EH) Nonhispanics (NH)	5.81	68	1.34
Monolingual English Hispanics (EH) Spanish-listening Hispanics (LH)	7.96	68	1.33
Nonhispanics (NH) Spanish-listening Hispanics (LH)	2.15	68	0.46

***$p < .001$

**$p < .01$

*$p < .05$

Braun, 1975). It is interesting to note that it was the monolingual English-speaking students whose content learning was increased with English-Spanish vocabulary instruction. Therefore the positive effect of the English-Spanish vocabulary in English-speaking content learning was not related to Spanish linguistic background, as one might expect, but possibly to (1) better information processing and storage when two word cues are given for the same concept, or (2) better information retrieval when two words (English and Spanish) are given for the same concepts in content-information storage. Furthermore, it is interesting to note that the English-Spanish vocabulary instruction did not detract from the content learning of any language-ethnic group, but did provide a way for increasing English-Spanish vocabulary development daily.

The Hispanic students with the least English ability, the Spanish-speaking Hispanic student group, scored most poorly in the English content tests. This finding helps explain the high dropout statistics in the United States of minority students who are linguistically different. The finding also supports the Supreme Court decision, Lau vs. Nichols, which declared that if the students are linguistically different and do not understand English, they are not receiving a secondary education unless the schools provide instruction which meets their language needs. In contrast to their low achievement in English test scores, the Spanish-speaking students scored significantly higher than the monolingual English-speaking Nonhispanic students in the English-Spanish vocabulary tests. From this one could infer that it is not the native intelligence of the Spanish-speaking Hispanic student which causes the lower content scores, but it is the failure of schools to provide content instruction in the language which is understood by the student.

Implications

This investigation would suggest that the following two hypotheses would warrant further study:

Second or foreign language vocabulary instruction in content classes increases second language learning without decreasing content learning.

Content learning is increased when short key-vocabulary instruction is given at the beginning and the end of each instructional session.

This investigation also showed that English-speaking and Spanish-speaking students can increase their English-Spanish vocabulary easily in content area classes using key-vocabulary related to the content of the instructional sessions. The same brief concentrated vocabulary repetition method could be provided on a daily basis in English-speaking content-area classes. Providing vocabulary enriched content-area secondary courses, such as Chemistry I, Spanish Enrichment, or Typing II, French Enrichment, could extend the English language programs and the foreign language programs offered by the secondary schools.

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